paper. Closely packed, disk-like sub-units, 150–250 Å in diameter and 30–40 Å thick, have been detected in the membranes of Hb-free mammalian erythrocyte ghosts treated with osmium tetroxide or PTA and shadowed with chromium[47]. Exposure of PTA-treated material to alcohol–ether–chloroform releases individual disks. Carbon replicas of chromium-shadowed erythrocyte and epithelial cells also show closely packed, 100–200 Å-diameter circular regions, often seen to be arranged in linear rows[48]. In epithelial cells these circular regions are of 150 Å diameter and possess dark central cores of 30–60 Å diameter. Glycerol-treated human erythrocytes, quickly frozen at −196° C and dehydrated and platinum–carbon replicated at −100° C, also show closely packed circular regions of about 150–250 Å diameter in their surfaces[49].

Closely apposed outer membranes of adjacent mitochondria in cat retinal rod cells seen in PbOH-stained transverse sections have a regular, darkly beaded appearance[50] with a periodicity of 160 Å. Mitochondria in the proximal tubule cells of the kidneys of rats treated with 'Phenergan' undergo structural reorganizations in which the christæ come together in parallel closely packed lamellæ[51]. As the cristæ come together they show a beaded pattern of 125–150 Å periodicity in PbOH-stained transverse sections. On close packing, cross-striations with a periodicity of 250–300 Å appear[51]. These patterns presumably have their basis in a reinforcement of differential staining effects on the sub-structural elements of individual membranes. Electron micrographs of regular associations of small particles with inner mitochondrial membranes also have been published[52].

Beaded patterns with a repeat distance of 85–95 Å are seen in thin, permanganate-fixed, transverse sections of plasma membranes at synaptic disks[53]. When these membranes and those of synaptic vesicles, myelin and retinal rod outer-segments are examined in thin tangential sections, hexagonally distributed, darkly staining central regions surrounded by lightly staining facets often are evident[53]. A pattern of 70 Å-diameter darkly staining disks with a repeat period of 140 Å appears in transverse sections of uranyl-acetate stained, closely apposed plasma membranes of *Cordylophora* cells[54]. The disks are seen clearly in both outer envelopes of each membrane.

In one case membranes have been found which appear to be 'frozen' in the open configuration by structural modifications. The inner surface of the shell wall of the protozoan *Gromia oviformis* is covered with a sheath of up to 10 separate membranes[55]. Each membrane consists . . . "of minute cylinders, approximately 100 Å in diameter and up to 200 Å in length organized in hexagonal array. The axes of the cylinders lie perpendicular to the membrane with a centre to centre spacing of about 210 Å"[55].

Thus, the electron-optical evidence from diverse material prepared by all techniques converges to indicate the existence in biological membranes of regular sub-structural differentiations of disk-like or cylindrical regions, often in hexagonal array.

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NEWS and VIEWS

The Geological Society of London: Officers

The following have been elected officers of the Geological Society of London for the session 1963–64: *President*, Prof. O. M. B. Bulman, Woodwardian professor of geology in the University of Cambridge and Fellow of Sidney Sussex College; *Vice-Presidents*, Mr. J. M. Edmonds, curator of Geological Collections, University Museum, Oxford, Mr. P. Evans, Berkhamsted, Hertfordshire, Prof. S. E. Hollingworth, Yates-Goldsmid professor of geology in the University of London, University College, London, and Prof. L. Hawkes, emeritus professor of geology, University of London; *Secretaries*, Dr. P. A. Sabine, chief petrographer, H.M Geological Survey and Museum, and Mr. W. B. Harland, lecturer in geology, University of Cambridge and Fellow of Gonville and Caius College; *Foreign Secretary*, Prof. O. T. Jones, emeritus professor of geology in the University of Cambridge; *Treasurer*, Dr. W. Bullerwell, chief geophysicist, H.M. Geological Survey and Museum.